

Soil and Water Economy in the Pueblo Southwest: I. Field Studies at Mesa Verde and Northern Arizona



Guy R. Stewart; Maurice Donnelly

The Scientific Monthly, Vol. 56, No. 1 (Jan., 1943), 31-44.

Stable URL:

<http://links.jstor.org/sici?sici=0096-3771%28194301%2956%3A1%3C31%3ASAWAIT%3E2.0.CO%3B2-T>

The Scientific Monthly is currently published by American Association for the Advancement of Science.

Your use of the JSTOR archive indicates your acceptance of JSTOR's Terms and Conditions of Use, available at <http://www.jstor.org/about/terms.html>. JSTOR's Terms and Conditions of Use provides, in part, that unless you have obtained prior permission, you may not download an entire issue of a journal or multiple copies of articles, and you may use content in the JSTOR archive only for your personal, non-commercial use.

Please contact the publisher regarding any further use of this work. Publisher contact information may be obtained at <http://www.jstor.org/journals/aaas.html>.

Each copy of any part of a JSTOR transmission must contain the same copyright notice that appears on the screen or printed page of such transmission.

For more information on JSTOR contact jstor-info@umich.edu.

©2003 JSTOR

<http://www.jstor.org/>
Tue Nov 25 19:57:40 2003

SOIL AND WATER ECONOMY IN THE PUEBLO SOUTHWEST

I. FIELD STUDIES AT MESA VERDE AND NORTHERN ARIZONA

By Dr. GUY R. STEWART and Dr. MAURICE DONNELLY

SOIL CONSERVATION SERVICE, U. S. DEPARTMENT OF AGRICULTURE

CENTURIES before the permanent settlement of America by white men the Pueblo Indians of the arid Southwest developed methods of soil and water conservation which they used effectively to maintain production of their crops of corn and beans. The extent and variety of these early American methods of soil and water conservation are the subject of former articles in *THE SCIENTIFIC MONTHLY*¹ and elsewhere.²

Since then further work has been carried out to try to determine the effectiveness in soil and water conservation of the agricultural practices of the first cultivators at four centers of Pueblo settlement. The locations studied were the Mesa Verde Plateau, the primitive villages adjacent to Navajo Mountain in northern Arizona, the ruins found on the northern rim of the Grand Canyon and the early settlements of the San Francisco Mountains. The general situation of these places of study is shown on the accompanying map of the Pueblo Plateau (Fig. 1). In addition, further examination was made of the systems of flood water irrigation in use at the present day on the Zuni Reservation in central New Mexico.

MESA VERDE PLATEAU

Fig. 2 shows the location of the areas on Chapin Mesa, Wickiup Canyon and Wetherill Mesa, where further detailed studies were made on the Mesa Verde

¹ Guy R. Stewart, *SCIENTIFIC MONTHLY*, 51: 201-220 and 329-340, September and October, 1940.

² Guy R. Stewart, *Soil Conservation*, 5: 112-115, 1939.

Plateau. The flood water ditch mapped previously was traced for approximately three fourths of a mile above Mummy Lake, showing that this drainage way would have intercepted an appreciable portion of the runoff from the upper part of Chapin Mesa. It is possible that a branch of the ditch may have extended to the east, which would have picked up an intermittent stream flow from the west branch of Soda Canyon. Norden-skiold³ reported indications of such a

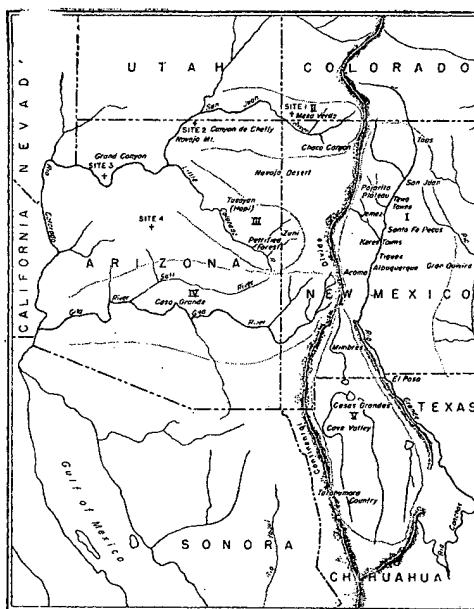


FIG. 1. MAP OF PUEBLO PLATEAU
PUEBLO CULTURE AREAS: I—RIO GRANDE; II—SAN JUAN; III—LITTLE COLORADO; IV—GILA; V—MIMBRES CHIHUAHUA. AFTER MAP BY SCHOOL OF AMERICAN RESEARCH.

³ G. E. A. Nordenskiöld, "The Cliff Dwellers of the Mesa Verde, Southwestern Colorado, Their Pottery and Implements."

supply feeder in his memoir describing conditions at Mesa Verde in 1889. John Wetherill,⁴ in a discussion of evidences of early agriculture at Mesa Verde, has stated that he remembered seeing signs of such a ditch in his first visits to the plateau. This branch supply ditch could not be traced during the work in 1940.

Further soil profile studies along the flood-water ditch were made by H. K.

several acres, just below the Far View group of ruins, still showed evidence of field checks made with small boulders, indicating that the water running down to the ditch was intercepted in places to supply fields along the way. Where the flood ditch first crossed the modern highway, there is the beginning of a series of fields, with a gentle slope of $1\frac{1}{2}$ to 4 per cent., which have a relatively deep surface soil, thoroughly adequate for crop production if run-off were arrested and the rainfall supplemented by water from the uplands. The location of probable corn fields can be recognized at intervals, along the ditch, by noting the areas where water could be impounded with earth spreaders and simple field checks.

Local observers with whom the writers have discussed the value and importance of a supply ditch for flood water under the conditions found at Mesa Verde, have pointed out that the rainfall is probably only moderately higher in the uplands than it is along the lower part of Chapin Mesa. In answer to this it should be noted that the average rainfall of approximately 21 inches is well below the figure for rainfall in the corn-producing portions of the United States, amounting to about 35 inches for a sure crop. Though the strains of corn used by the Pueblo people were undoubtedly hardy and relatively drought-resistant, it appears likely that the 21-inch rainfall of Mesa Verde is lower than would be needed to produce maximum crops, even with specialized dry land types. With the lower rainfall of 7 to 8 inches occurring in much of the Hopi and Zuni country it is certain that appreciable amounts of supplementary moisture would be required. Even a slightly higher rainfall on the uplands at Mesa Verde would have supplied run-off which might have brought up the moisture on the lowland fields, when conducted there by the flood-water ditch, so that crop production would have been more cer-

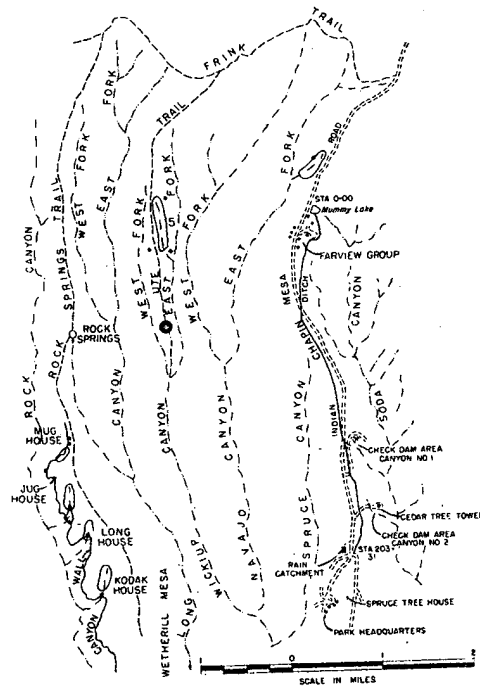


FIG. 2. LOCATION MAP
OF OLD INDIAN DAMS IN THE MESA VERDE NATIONAL
PARK, COLORADO.

Woodward and the writers. These showed an adequate depth of loam or silt loam soil deposited in the ditch amounting to two feet or more at most points, so that crops of corn or beans could have been raised in the greater part of the broad waterway itself in the same manner that the present-day Hopis and Zunis plant the flood-water stream beds. In addition, a gently sloping area of

⁴ John Wetherill, personal communication, 1939.